

IN THE CLAIMS

Please cancel Claims 1-59 without prejudice to or disclaimer of the subject matter thereof.

Please add Claims 60-78 as follows:

1-59 (Canceled)

60. (New) An isolated nucleic acid molecule selected from the group consisting of: (a) a nucleic acid molecule that encodes a protein selected from the group consisting of SEQ ID NO:2, SEQ ID NO:5, SEQ ID NO:8, SEQ ID NO:11, SEQ ID NO:14, SEQ ID NO:19, SEQ ID NO:25, SEQ ID NO:31, SEQ ID NO:37, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:53, SEQ ID NO:54, SEQ ID NO:55, SEQ ID NO:58, SEQ ID NO:68, SEQ ID NO:73, SEQ ID NO:74 and proteins that are at least 95% identical to any of said sequences, wherein said protein exhibits carboxylesterase activity; and (b) an isolated nucleic acid molecule fully complementary to a nucleic acid molecule of (a).

61. (New) The nucleic acid molecule of Claim 60, wherein said nucleic acid molecule encodes a protein comprising an amino acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:5, SEQ ID NO:8, SEQ ID NO:11, SEQ ID NO:14, SEQ ID NO:19, SEQ ID NO:25, SEQ ID NO:31, SEQ ID NO:37, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:53, SEQ ID NO:54, SEQ ID NO:55, SEQ ID NO:58, SEQ ID NO:68, SEQ ID NO:73, and SEQ ID NO:74.

62. (New) The nucleic acid molecule of Claim 60, wherein said nucleic acid molecule is selected from the group consisting of: SEQ ID NO:1, SEQ ID NO:3, SEQ ID NO:4, SEQ ID NO:6, SEQ ID NO:7, SEQ ID NO:9, SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:13, SEQ ID NO:15, SEQ ID NO:16, SEQ ID NO:17, SEQ ID NO:18, SEQ ID NO:20, SEQ ID NO:21, SEQ ID NO:22, SEQ ID NO:23, SEQ ID NO:24, SEQ ID NO:26, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:29,

SEQ ID NO:30, SEQ ID NO:32, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:35, SEQ ID NO:36, SEQ ID NO:38, SEQ ID NO:51, SEQ ID NO:52, SEQ ID NO:57, SEQ ID NO:59, SEQ ID NO:60, SEQ ID NO:61, SEQ ID NO:67, SEQ ID NO:69, SEQ ID NO:70, SEQ ID NO:71, and SEQ ID NO:72.

63. (New) A recombinant molecule comprising a nucleic acid molecule as set forth in Claim 60 operatively linked to a transcription control sequence.

64. (New) A recombinant virus comprising a nucleic acid molecule as set forth in Claim 60.

65. (New) A recombinant cell comprising a nucleic acid molecule as set forth in Claim 60.

66. (New) A method to produce a carboxylesterase protein, said method comprising culturing a cell capable of expressing said protein, said protein being encoded by a nucleic acid molecule of Claim 60, part (a).

67. (New) The method of Claim 66, wherein said protein comprises an amino acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:5, SEQ ID NO:8, SEQ ID NO:11, SEQ ID NO:14, SEQ ID NO:19, SEQ ID NO:25, SEQ ID NO:31, SEQ ID NO:37, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:53, SEQ ID NO:54, SEQ ID NO:55, SEQ ID NO:58, SEQ ID NO:68, SEQ ID NO:73, and SEQ ID NO:74.

68. (New) The method of Claim 66, wherein said nucleic acid molecule comprises a nucleic acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:4, SEQ ID NO:7, SEQ ID NO:10, SEQ ID NO:13, SEQ ID NO:16, SEQ ID NO:18, SEQ ID NO:21, SEQ ID NO:23, SEQ ID NO:24, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:30, SEQ ID

NO:33, SEQ ID NO:34, SEQ ID NO:36, SEQ ID NO:51, SEQ ID NO:57, SEQ ID NO:60, SEQ ID NO:67, SEQ ID NO:70, and SEQ ID NO:72.

69. (New) An isolated protein comprising an amino acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:5, SEQ ID NO:8, SEQ ID NO:11, SEQ ID NO:14, SEQ ID NO:19, SEQ ID NO:25, SEQ ID NO:31, SEQ ID NO:37, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:53, SEQ ID NO:54, SEQ ID NO:55, SEQ ID NO:58, SEQ ID NO:68, SEQ ID NO:73, SEQ ID NO:74 and an amino acid sequence 95% identical to any of said amino acid sequences, wherein said isolated protein has carboxylesterase activity.

70. (New) The protein of Claim 69, wherein said protein, when administered to an animal, elicits an immune response against a carboxylesterase protein.

71. (New) The protein of Claim 69, wherein said protein is encoded by a nucleic acid molecule selected from the group consisting of: SEQ ID NO:1, SEQ ID NO:4, SEQ ID NO:7, SEQ ID NO:10, SEQ ID NO:13, SEQ ID NO:16, SEQ ID NO:18, SEQ ID NO:21, SEQ ID NO:23, SEQ ID NO:24, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:30, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:36, SEQ ID NO:51, SEQ ID NO:57, SEQ ID NO:60, SEQ ID NO:67, SEQ ID NO:70, and SEQ ID NO:72.

72. (New) The protein of Claim 69, wherein said protein comprises an amino acid sequence selected from the group consisting of: SEQ ID NO:2, SEQ ID NO:5, SEQ ID NO:8, SEQ ID NO:11, SEQ ID NO:14, SEQ ID NO:19, SEQ ID NO:25, SEQ ID NO:31, SEQ ID NO:37, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:53, SEQ ID NO:54, SEQ ID NO:55, SEQ ID NO:58, SEQ ID NO:68, SEQ ID NO:73, SEQ ID NO:74.

73. (New) A method to identify a compound capable of inhibiting flea carboxylesterase activity, said method comprising:

- (a) contacting an isolated flea carboxylesterase protein of Claim 69 with a putative inhibitory compound under conditions in which, in the absence of said compound, said protein has carboxylesterase activity; and
- (b) determining if said putative inhibitory compound inhibits said activity.

74. (New) The method of Claim 73, wherein said protein comprises an amino acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:5, SEQ ID NO:8, SEQ ID NO:11, SEQ ID NO:14, SEQ ID NO:19, SEQ ID NO:25, SEQ ID NO:31, SEQ ID NO:37, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:53, SEQ ID NO:54, SEQ ID NO:55, SEQ ID NO:58, SEQ ID NO:68, SEQ ID NO:73, and SEQ ID NO:74.

75. (New) The method of Claim 73, wherein said nucleic acid molecule comprises a nucleic acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:4, SEQ ID NO:7, SEQ ID NO:10, SEQ ID NO:13, SEQ ID NO:16, SEQ ID NO:18, SEQ ID NO:21, SEQ ID NO:23, SEQ ID NO:24, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:30, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:36, SEQ ID NO:51, SEQ ID NO:57, SEQ ID NO:60, SEQ ID NO:67, SEQ ID NO:70, and SEQ ID NO:72.

76. (New) A test kit to identify a compound capable of inhibiting flea carboxylesterase activity, said test kit comprising an isolated flea carboxylesterase protein of Claim 69 having esterase activity and a means for determining the extent of inhibition of said activity in the presence of a putative inhibitory compound.

77. (New) The test kit of Claim 76, wherein said protein comprises an amino acid sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:5, SEQ ID NO:8, SEQ ID NO:11, SEQ ID NO:14, SEQ ID NO:19, SEQ ID NO:25, SEQ ID NO:31, SEQ ID NO:37, SEQ ID NO:39, SEQ ID NO:40, SEQ ID NO:41, SEQ ID NO:42, SEQ ID NO:43, SEQ ID NO:44, SEQ ID NO:53, SEQ ID NO:54, SEQ ID NO:55, SEQ ID NO:58, SEQ ID NO:68, SEQ ID NO:73, and SEQ ID NO:74.

78. (New) The test kit of Claim 76, wherein said nucleic acid molecule comprises a nucleic acid sequence selected from the group consisting of SEQ ID NO:1, SEQ ID NO:4, SEQ ID NO:7, SEQ ID NO:10, SEQ ID NO:13, SEQ ID NO:16, SEQ ID NO:18, SEQ ID NO:21, SEQ ID NO:23, SEQ ID NO:24, SEQ ID NO:27, SEQ ID NO:28, SEQ ID NO:30, SEQ ID NO:33, SEQ ID NO:34, SEQ ID NO:36, SEQ ID NO:51, SEQ ID NO:57, SEQ ID NO:60, SEQ ID NO:67, SEQ ID NO:70, and SEQ ID NO:72.